Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Previously Presented) A method for measuring the agglomerative state of asphaltenes in oil containing asphaltenes, comprising applying to the oil a series of pulses of acoustic energy, each pulse comprising acoustic energy at multiple frequencies, thereby scattering at least part of the energy; detecting, for each of a plurality of pulses in the series, the scattered acoustic energy to produce amplitude versus time data; resolving the amplitude versus time data to obtain a magnitude of the detected scattered acoustic energy at selected frequencies; averaging over the plurality of pulses the magnitude for each pulse at each selected frequency, and determining from the averaging the agglomerative state of the asphaltenes.

2. (Previously Presented) A method as set forth in claim 1 wherein the selected frequencies comprise at least three different frequencies.

3. (Previously Presented) A method as set forth in claim 1 wherein the selected frequencies comprise at least fifteen different frequencies.

4. (Original) A method as set forth in claim 1 wherein the steps are carried out without diluting the hydrocarbon liquid.

5. (Original) A method as set forth in claim 4 wherein the steps of the method are carried out substantially instantaneously.

6. (Original) A method as set forth in claim 5, wherein the detected scattered acoustic energy is back-scattered acoustic energy.

7. (Previously Presented) A method as set forth in claim 6, wherein the scattered acoustic energy is detected over a frequency range of from about 0.1 MHz to about 20 MHz.

8. (Previously Presented) A method as set forth in claim 7, wherein the scattered acoustic energy is detected over a frequency range of from about 0.1 MHz to about 200 MHz.

9. (Previously Presented) A method as set forth in claim 8, wherein the scattered acoustic energy is detected over a frequency range of from about 14 MHz to about 20 MHz.

10. (Original) A method as set forth in claim 1, wherein the detecting is carried out by at least one sensor which sensor is incorporated in a signal input probe.

11. (Original) A method as set forth in claim 1, wherein the detecting is carried out by at least one sensor which sensor is separate from a signal input probe.

12. (Withdrawn) A method as set forth in claim 11, wherein the signal input probe and the sensor are located so that the signal direction of the probe intersects the signal direction of the sensor at an angle of less than about 90°.

13. (Withdrawn) A method as set forth in claim 12, wherein the signal input probe and the sensor are located so that the signal direction of the probe intersects the signal direction of the sensor at an angle of less than about 60°.

14. (Withdrawn) A method as set forth in claim 13, wherein the signal input probe and the sensor are located so that the signal direction of the probe intersects the signal direction of the sensor at an angle of less than about 45°.

15. (Previously Presented) A method as set forth in claim 1, wherein the resolving of the amplitude versus time data comprises gating the detected scattered acoustic energy to that part of the detected energy emanating from a focal region and Fourier transforming the amplitude versus time data into a magnitude vs. frequency format.

16. (Previously Presented) A method as set forth in claim 1, wherein the pulses of acoustic energy are applied as a tone-burst and the step of resolving of the amplitude versus time data comprises detecting the magnitude of the scattered energy at selected frequencies.

17. (Previously Presented) A method as set forth in claim 1, wherein the averaging over the series of pulses the magnitude for each pulse at each selected frequency produces an average of the magnitude for each selected frequency, and the determining of the agglomerative state of the asphaltenes is effected by comparing the that average for each selected frequency with a standard.

18. (Original) A method as set forth in claim 17, wherein the standard is a sample of known particle size.

19. (Original) A method as set forth in claim 17, wherein the standard is a model of particle size based on scattering theory.

20. (Original) A method as set forth in claim 1, wherein the oil containing asphaltenes is in a process flow stream and the signal of acoustic energy is applied to the oil in the process flow stream.

21. (Previously Presented) A method for measuring the agglomerative state of asphaltenes in an oil containing asphaltenes comprising:

a. removing a sample of the oil and without diluting the oil;

b. applying to the sample a series of pulses of acoustic energy, each pulse comprising acoustic energy at multiple frequencies, thereby scattering at least part of the energy;

c. detecting, for each of a plurality of pulses in the series, the magnitude of the scattered acoustic energy at selected frequencies to produce amplitude versus time data;

d. resolving the amplitude versus time data to obtain a magnitude of the detected scattered acoustic energy at selected incremental frequencies;

e. averaging over the plurality of pulses the magnitude for each pulse at each selected frequency;

f. deriving from the averaging a distribution of the relative size of asphaltene particles scattering acoustic energy; and

g. determining the agglomerative state of the asphaltene particles.

22. (Original) A method as in claim 20, having the additional step of returning the undiluted oil sample.

23. (Withdrawn) A method for measuring the agglomerative state of asphaltenes in oil containing asphaltenes, comprising applying to the oil a series of pulses of acoustic energy, each pulse comprising acoustic energy at multiple frequencies, thereby scattering at least part of the energy, detecting, for each of a plurality of pulses in the series, the scattered acoustic energy to produce amplitude versus time data, resolving the amplitude versus time data to obtain a magnitude of the detected scattered acoustic energy at selected frequencies, averaging over the plurality of pulses the magnitude for each pulse at each selected frequency, and determining from the averaging the agglomerative state of the asphaltenes, wherein the oil containing asphaltenes is in a process flow stream, and wherein the method is carried out in a bench-scale device.

24. (Previously Presented) A method for controlling the agglomeration of asphaltenes in oil which comprises applying a series of pulses of acoustic energy to the oil, each pulse comprising acoustic energy at multiple frequencies, thereby scattering at least a part of the energy, detecting, for each of a plurality of pulses in the series, the scattered energy at selected frequencies to produce amplitude versus time data; resolving the amplitude versus time data to obtain a magnitude of the detected scattered energy at selected incremental frequencies, averaging over the plurality of pulses the magnitude for each pulse at each selected frequency to obtain average magnitude versus frequency data, comparing the average magnitude versus frequency data with a standard; and acting to control the number of particles having a particle size corresponding to the selected incremental frequencies.

25. (Previously Presented) A method as set forth in claim 24, wherein the selected frequencies are limited to a frequency range of acoustic energy scattered by the agglomerated asphaltene particles characteristic of the oil.

26. (Previously Presented) A method as set forth in claim 24, wherein the scattered acoustic energy is detected over a frequency range of from about 14 MHz to about 20 MHz.